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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/759,312	01/12/2001	Yoshihiro Ueta	299002051800	1784

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EXAMINER

MULPURI, SAVITRI

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/759,312

Applicant(s)

Ueta et al

Examiner

First Last

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1234



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE, amdt filed on 5/15/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above, claim(s) 8-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/15/03 has been entered.

This action is in response to the applicant's request for continued application with amendment filed on 5/15/03 and election of product claims 1-7, 12.

Claim Rejections - 35 USC § 112

Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Acceptor doping layer comprises $\text{Ga}_x \text{In}_y \text{Al}_{(1-x-y)} \text{N}$ (where $0 < x < 1, 0 < y < 1$ and $0, x+y < 1$) is already recited in claim 1.

In claim 4, line 2 "lawer" is not proper word and should be "layer".

In claim 12, line 8 "con pound" should be replaced with ----compound"

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al (US 6,201,823 in combination with Zauner et al (publication by materials research society).

Kimura et al discloses a compound semiconductor light emitting device having semiconductor multi layer structure on sapphire substrate, wherein multi layer structure comprises acceptor doping layer and evenly formed of multi quantum well active layer "107" with seven period alternating quantum well and barrier layers of GaInN formed on n-AlGaIn cladding layer "105" and n-GaN optical guide layer "106". Kimura further discloses magnesium doped P-AlGaIn cladding layer "108" and magnesium doped p-type GaN optical guide layer "109" (see background invention). Kimura et al discloses in the background invention, even layers of multiple layers of GaN are formed on flat surface of the sapphire substrate (see fig. 1 and fig. 2 and related description). Kimura does not disclose the starting substrate is GaN substrate having tilted crystal orientation from <0001> direction by an angle which is equal to or greater than about 0.5 and less than or equal to 2 degrees. Inherently active layer is formed from the substrate by a distance greater than or equal to 1 micron.

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Zauner et al teaches growing GaN layer on GaN substrate as a homo-epitaxial growth at tilted angle of 0, 2, and 4 degrees to obtain GaN layers with two orders of magnitude reduction in density of grown hillocks as compared to homo-epitaxial films grown on $\langle 0001 \rangle$ direction or hetero- epitaxial growth such GaN grown on sapphire substrate. Zauner particularly teaches obtaining smoother layers due to suppression of formation hexagonal pyramids of GaN growth because GaN is grown on GaN substrate with off-angle orientation from $\langle 0001 \rangle$ direction (see abstract and the introduction section). Zauner et al compared the results GaN grown on GaN substrate off-oriented from $\langle 0001 \rangle$ direction with GaN grown on GaN substrate with $\langle 0001 \rangle$ orientation and hetero-epitaxial growth such as GaN grown on sapphire substrate with $\langle 0001 \rangle$ orientation (see results and discussions). It would have been obvious to one of ordinary skill in the art to replace sapphire substrate with GaN substrate having off-orientation from $\langle 0001 \rangle$ direction for the benefit of obtaining smoother layers with less density of grown hillocks by two orders of magnitude compared to homo- epitaxial growth of GaN on GaN with $\langle 0001 \rangle$ direction and hetero epitaxial growth of GaN on sapphire $\langle 0001 \rangle$ direction. Modified invention of Kimura, as modified by the teaching Zauner, would have active layer with surface roughness which is equal to or less than a thickness of well layer in the quantum well structure because same technique of homoepitaxial growth of GaN grown on GaN substrate with tilt angle of 0, 2, 4 degrees tilted away from $\langle 0001 \rangle$ direction to $\langle 11-20 \rangle$ or $\langle 1-100 \rangle$.

Applicant's arguments with respect to claims 1-7, 12 are have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is 703-305-5184. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


SAVITRI MULPURI
PRIMARY EXAMINER

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1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-7, 12, drawn to product, classified in class 257, subclass 103.

II. Claims 8-11, drawn to method, classified in class 438, subclass 46.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be produced by a materially different process with no stopping growth step of active layer for certain time period of time after forming the well layer of the active layer.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr Eide on 6/6/03 a provisional election was made without traverse to prosecute the invention of product, claims 1-7, 12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-11 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently


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named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is (703) 305-5184.

SM

June 15, 2003


SAVITRI MULPURI
PRIMARY EXAMINER